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WHAT IS CLAIMED IS:

1. A process for producing a complex carbohydrate, which comprises:

selecting, as enzyme sources, a culture broth of a microorganism capable of producing a sugar nucleotide from a nucleotide precursor and a sugar, or a treated product of the culture broth, and a culture broth of a microorganism or animal cell capable of producing a complex carbohydrate from a sugar nucleotide and a complex carbohydrate precursor, or a treated product of the culture broth;

carrying out an enzyme reaction in an aqueous medium containing the enzyme sources, the nucleotide precursor, the sugar and the complex carbohydrate precursor to form and accumulate the complex carbohydrate in the aqueous medium; and

recovering the complex carbohydrate from the aqueous medium.

2. A process for producing a sugar nucleotide, which comprises:

selecting, as an enzyme source, a culture broth of a microorganism capable of producing a sugar nucleotide from a nucleotide precursor and a sugar, or a treated product of the culture broth;

carrying out an enzyme reaction in an aqueous medium containing the enzyme source, the nucleotide precursor and

the sugar to form and accumulate the sugar nucleotide in the aqueous medium; and

recovering the sugar nucleotide from the aqueous medium.

3. A process for producing a complex carbohydrate, which comprises:

selecting, as an enzyme source, a culture broth of a microorganism or animal cell capable of producing a complex carbohydrate from a sugar nucleotide and a complex carbohydrate precursor, or a treated product of the culture broth;

carrying out an enzyme reaction in an aqueous medium containing the enzyme source, the complex carbohydrate and the sugar nucleotide prepared according to the process of claim 2 to form and accumulate the complex carbohydrate in the aqueous medium, and

recovering the complex carbohydrate from the aqueous medium.

4. The process according to any one of claims 1, 2 and 3, wherein the treated product of the culture broth is a concentrated product of the culture broth, a dried product of the culture broth, cells obtained by centrifuging the culture broth, a dried product of the cells, a freeze-dried product of the cells, a surfactant-treated product of the cells, an ultrasonic-treated product of the cells, a mechanically

disrupted product of the cells, a solvent-treated product of the cells, an enzyme-treated product of the cells, a protein fraction of the cells, an immobilized product of the cells or an enzyme preparation obtained by extracting from the cells.

5. The process according to claim 1 or 2, wherein the nucleotide precursor is a nucleotide precursor selected from orotic acid, uracil, orotidine and uridine.

6. The process according to any one of claims 1, 2 and 3, wherein the sugar nucleotide is a uridine diphosphate compound.

7. The process according to claim 6, wherein the uridine diphosphate compound is a uridine diphosphate compound selected from uridine-diphosphate glucose, uridine-diphosphate galactose, uridine-diphosphate N-acetylglucosamine and uridine-diphosphate N-acetylgalactosamine.

8. The process according to claim 1 or 2, wherein the sugar is a sugar selected from glucose, galactose, glucosamine, N-acetylglucosamine and N-acetylgalactosamine.

9. The process according to claim 1 or 3, wherein the complex carbohydrate precursor is a complex carbohydrate precursor selected from monosaccharides, oligosaccharides, proteins, peptides, glycoproteins, glycolipids and glycopeptides.

10. The process according to claim 9, wherein the complex carbohydrate precursor is N-acetylglucosamine or GlcNAc β 1-3Gal β 1-4Glc.

11. The process according to claim 1 or 3, wherein the complex carbohydrate is a glucose-containing complex carbohydrate, a glucosamine-containing complex carbohydrate, a galactose-containing complex carbohydrate, a galactosamine-containing complex carbohydrate, a mannose-containing complex carbohydrate, a fucose-containing complex carbohydrate or a neuraminic acid-containing complex carbohydrate.

12. The process according to claim 11, wherein the galactose-containing complex carbohydrate is a complex carbohydrate selected from lacto-N-tetraose and lacto-N-neotetraose.

13. The process according to claim 1 or 2, wherein the microorganism capable of producing a sugar nucleotide from a nucleotide precursor and a sugar is a yeast.

14. The process according to claim (13), wherein the yeast is a yeast selected from microorganisms belonging to the genus *Saccharomyces*, the genus *Candida*, the genus *Pichia*, the genus *Torulopsis*, the genus *Debaryomyces*, the genus *Zygosaccharomyces*, the genus *Kluyveromyces*, the genus *Hansenula* and the genus *Brettanomyces*.

15. The process according to claim 14, wherein the yeast is a yeast selected from *Saccharomyces cerevisiae*,

Candida utilis, *Candida parapsilosis*, *Candida krusei*, *Candida versatilis*, *Candida lipolytica*, *Candida zeylanoides*, *Candida guilliermondii*, *Candida albicans*, *Candida humicola*, *Pichia farinosa*, *Pichia ohmeri*, *Torulopsis candida*, *Torulopsis sphaerica*, *Torulopsis xylinus*, *Torulopsis famata*, *Torulopsis versatilis*, *Debaryomyces subglobosus*, *Debaryomyces cantarellii*, *Debaryomyces globosus*, *Debaryomyces hansenii*, *Debaryomyces japonicus*, *Zygosaccharomyces rouxii*, *Zygosaccharomyces bailii*, *Kluyveromyces marxianus*, *Hansenula anomala*, *Hansenula jadinii*, *Brettanomyces lambicus* and *Brettanomyces anomalus*.

16. The process according to claim 1 or 3, wherein the microorganism capable of producing a complex carbohydrate from a sugar nucleotide and a complex carbohydrate precursor is *Escherichia coli* or *Saccharomyces cerevisiae*.

17. The process according to claim 1 or 3, wherein the animal cell capable of producing a complex carbohydrate from a sugar nucleotide and a complex carbohydrate precursor is COS-7 cell or namalwa KJM-1 cell.

18. The process according to claim 17, wherein the namalwa KJM-1 cell is a namalwa KJM-1 cell which contains a recombinant DNA of a DNA fragment containing a gene encoding β 1,3-galactosyltransferase with a vector.

19. The process according to claim 18, wherein the gene encoding β 1,3-galactosyltransferase is derived from human melanoma cells.

20. The process according to claim 18, wherein the animal cell is namalwa KJM-1/pAMoERSAW1.